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The higher education in India-Ranking of Indian institutions as compared to other countries

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Abstract
From a study of ranking systems of higher education by international bodies such as U21Ranking of National Higher Education Systems, The Times of Higher Education World University rankings, etc., it has been observed that very few Colleges and Universities of India have been given a higher ranking as compared to many Foreign Higher Educational Institutions. In order to improve the Higher Education Systems in India, Govt. of India have taken various measures like making higher provisions in the budget for improving the standards of the higher education institutions as well as establish the new institutions. At the same time the Govt. have also started ranking of Indian Higher Education Institutions and the latest in this effort is India Rankings 2019– National Institutional Ranking Framework. This system identifies the Institutions on the basis of various parameters and ranking has been done accordingly.

Keywords: acceptability, budget and ranking systems

1. Introduction

In this Article I would like to analyze some of the reasons for Indian Higher Educational Institutions being ranked much below similar Institutions in various Countries. For example, the U21 Ranking of National Higher Education Systems as well as Times World University Ranking Systems has been placing Indian Higher Education Institutions much below Higher Education Intuitions of Countries like USA, UK & some other Countries. While there are various Parameters for such Rankings, in this Article, I would like to discuss factors like Teaching Methodology, Evaluation of Students during the course of training as well as at the end of the training, grading system and the methodology for selection of students for graduate studies and award of degrees as well as Research input.

In India the Higher Education System is governed by various Acts of Parliament and State Legislatures and by Rules & Regulations of the University Grants Commission / All India Council of Technical Education and other Statutory Bodies prescribing the standards of Higher Education in various branches like Engineering, Medicine, Management, Agriculture, LAW etc. There is also the National Education Policy adopted by the Parliament and monitored by the Ministry of Human Resource Development, Govt. of India. A number of Commissions on Education, for example, the University Education Commission (1948-49), the Secondary Education Commission (1952-53), the Education Commission (1964-66) and the National Commission on Teachers (1983-85) have gone into various aspects of Higher Education. The National Policy on Education, 1986 is being modified and a new Policy on Education is being developed by the Ministry of Human Resource Development in consultation with various stake holders, keeping in view the developments all over the World in areas of Education including Higher Educational and Research fields.

It has been noted that there are several problems including inadequate infrastructural facilities, large No. of vacancies of faculty positions, poor quality of faculty, out-dated teaching methods, declining research standards faced by Universities, Colleges etc. To overcome some of the above short comings the Govt. have made it mandatory to get the Higher Education Institutions (HEIs) accredited by National Assessment & Accreditation Council (NAAC) under the University Grants Commission (UGC) / National Board of Accreditation (NBA) under the All India Council for Technical Education (AICTE). In spite of the steps undertaken to improve the performance of HEIs, they do not find a high ranking place in the Global Ranking of Universities.

Though India has been ranked low in World Ranking Reports, there are certain reasons for not including Indian Institutions in the Higher Rank e.g.

- Some Courses certainly make a Higher Ranking but are over-shadowed as all the courses run by the Institution are considered as a whole in a Ranking system.
- Global Rankings place a lot of weight on Research capability and very little on the Quality of Teaching.

While research and innovation are obviously important to a society, the need of individual students is for knowledge and skills that will help them to secure high quality jobs.

A detailed analysis of the defects of the Ranking system is given in the Article by Print Edition-International – entitled "How Global University Rankings are Changing Higher Education" published in Working paper series: The Economist – 19th May, 2018 [1] and in the book entitled "Rankings and the Reshaping of Higher Education: the Battle for World Wide Excellence" published in Working paper series: Centre for Social and Educational Research – 01st January, 2011[2]. In the

light of the above discussions one need not lament on the lesser ranking of Indian Higher Education Institutions in the World Ranking System. Where there is a will there is a way to improve our systems of higher education to bring it at par with HEIs of high ranking countries.

2. Parameters of ranking system in India

The Parameters include Teaching Learning and Resources, Research and Professional Practice, Graduation Outcome, Outreach and Inclusivity, Perception (Peer Review).The International ranking systems provide the Indian students information about availability of the better systems of education in Foreign Countries to which they can migrate for Higher Education. Though the enrollment level in higher education in India has been doubled over a period of 11 years from 9% in 2002-03 to 25.8% in 2017-18, roughly only 1% of GDP is spent on Higher Education.

The Indian Govt. is contemplating to establish a Higher Education Commission in order to monitor the standards and licensing of accreditation bodies and provide strategies for improving the system to make them comparable or higher than the existing highly ranked Foreign Higher Education Institutions so that students aspiring for Higher Education are retained in India itself.

Recently the Annual Report of the Department of Higher Education, Ministry of Human Resource Development, Govt. of India – entitled "India Rankings 2019 – National Institutional Ranking Framework [3]" has brought out ranking of some Universities, Engineering Colleges, Management Colleges, Pharmacy Colleges, Medical Colleges, Architecture Colleges & Law Colleges, ranked on the basis of certain Para Meters in the area of Teaching, Learning & Research. These parameters are listed below:-

2.1 Teaching Learning and Resources

- Student Strength including Doctoral Students (SS)
- Faculty Student Ratio (FSR)
- Combined Matrix for Faculty with Ph.D. and Experience (FQE)
- Financial Resources and their Utilizations (FRU)

2.2 Research and Professional Practice

- Combined Metric for Publications (PU)
- Combined Metric for Quality of Publications (QP)
- IPR and Patents: Published & Granted (IPR)
- Footprint of Projects and Professional Practice (FPPP)

2.3 Graduation Outcome

- Combined Metric for Placement and Higher Studies (GPH)
- Metric for University Examinations (GUE)
- Median Salary (GMS)
- Metric for Number of Ph.D. Students Graduated (GPHD)

2.4 Outreach and Inclusivity

- Percentage of Students from Other States/Countries (Region Diversity) (RD)
- Percentage of Women (Women Diversity) (WD)
- Economically and Socially Challenged Students (ESCS)
- Facilities for Physically Challenged Students (PCS)

2.5 Perception (PR)

- Peer Perception: Employers (PREMP)
- Peer Perception: Academic Peers (PRACD)

On the basis of the above Parameters in addition to Overall rankings, rankings have been done separately for Engineering, Management, Pharmacy, Architecture, Medical, Law, General Colleges & Universities (all centrally funded Institutions) it has been noted that all the Institutions could not be ranked due to some of them not providing required information in time. There are some shortcomings in this ranking but during the course of next few years, the system will be improved and will become comparable to the internationally known ranking systems. Out of 200 Institutions taken up for ranking the following are the Top 10 Institutions:-

1. Indian Institute of Technology (IIT) Madras, Tamil Nadu
2. Indian Institute of Science (IISc), Bengaluru, Karnataka
3. Indian Institute of Technology (IIT), Delhi
4. Indian Institute of Technology (IIT), Bombay, Maharashtra
5. Indian Institute of Technology (IIT), Kharagpur, West Bengal
6. Indian Institute of Technology (IIT), Kanpur, Uttar Pradesh
7. Jawaharlal Nehru University (JNU), Delhi
8. Indian Institute of Technology (IIT), Roorkee, Uttarakhand
9. Indian Institute of Technology (IIT), Guwahati, Assam
10. Banaras Hindu University (BHU), Varanasi, Uttar Pradesh

3. U21 Ranking of national higher education systems (March, 2019) [4]

The Executive Summary of this Report along with a copy of the table showing the Overall Ranks for Higher Education Institutions (HEIs) of various Countries, whose ranking has been done by this survey is as follows:-

3.1 "This report presents the results for the eighth annual ranking of national systems of higher education undertaken under the auspices of the Universitas21 (U21) group of universities. Fifty national systems of higher education, from all continents, are evaluated across 24 indicators. The measures are standardized for population size. Countries are ranked overall and on each of four modules: Resources, policy Environment, Connectivity and Output. Within each measure the highest achieving country is given a score of 100 and scores for other countries are expressed as a percentage of this highest score".

3.2 "Resources and the Environment are input variables. Resources, whether private or public, are a necessary condition for a quality system of higher education but they must be complemented by a policy environment which facilitates their efficient use. The five measures in the Environment module include diversity of institutions, autonomy of institutions and the extent of external monitoring of institutional performance. The highest

ranked countries for Resources, based on five expenditure measures, are, in rank order, Switzerland, Sweden, Singapore, Denmark, Canada, Norway, Saudi Arabia and the United States. The countries with the most favourable Environment are judged to be the United States, Australia, New Zealand, Hong Kong SAR, Finland, the United Kingdom, Singapore and the Netherlands".

3.3 Connectivity and Output are measures of outcomes. The worth of a national higher education system is enhanced if it is well connected domestically with other sectors of the economy and is linked internationally in education and research. The five Connectivity measures are: joint publications with international authors and with authors from industry, international student numbers, web connectivity and the views of business on the extent of knowledge transfer. The nine Output measures encompass research output and its impact, student throughput, the national stock of graduates and researchers, the quality of a nation's best universities, and the employability of graduates".

3.4 "The top six nations for Connectivity are Switzerland, Austria, the United Kingdom, the Netherlands, Denmark and Singapore. The top country in the Output module is clearly the United States, followed by the United Kingdom, Switzerland, Australia, Denmark, Sweden and Canada".

3.5 "An overall ranking is derived using a weight of 40 per cent for Output and 20 per cent for each of the other three modules. The top eight countries, in rank order, are the United States, Switzerland, the United Kingdom, Sweden, Denmark, Canada, Singapore and Australia. A subsidiary ranking compares how nations perform relative to countries at similar levels of GDP per capita. The top ranked countries after this adjustment are the United Kingdom, Finland, Serbia, South Africa and Denmark".

3.6 "An indicator of domestic academic links is derived based on the prevalence of publications with authors from more than one university. In 2017 these linkages were greatest in France, Brazil, Singapore and the United States. There is a negative relationship between domestic and international joint publications: domestic links within the higher education sector tend to be more important for countries with large populations; international links are stronger for small countries".

3.7 "Changes over the most recent seven-year period are presented for four measures: research expenditure, publications, international joint publications and qualifications of the workforce. The largest percentage increases in research expenditure have occurred in Malaysia, Thailand, Slovakia and China. Research expenditure has fallen in several Eastern European countries, Spain and Italy. Research publications have more than doubled in five countries: Saudi Arabia, Malaysia, Russia, China and Iran. Rates of growth tend to be inversely related to levels. Countries showing the largest increases in the share of publications that are joint with international authors are Saudi Arabia, Greece, the Netherlands, the United Kingdom, Australia and Singapore".

Table 1

Rank (2019)	Rank (2018)	Country	Score (2019)	Score (2018)
1	1	United States	100.0	100.0
2	2	Switzerland	88.6	88.0
3	3	United Kingdom	84.5	82.6
4	4	Sweden	82.9	82.4
5	5	Denmark	82.5	81.7
6	8	Canada	81.9	79.6
7	9	Singapore	81.3	79.5
8	10	Australia	80.9	78.6
9	6	Finland	80.4	79.7
10	6	Netherlands	80.2	79.7
11	12	Norway	77.8	74.5
12	11	Austria	77.2	75.8
13	13	Belgium	73.6	73.3
14	14	New Zealand	71.5	71.1
15	17	Hong Kong SAR	70.2	67.8
16	15	Germany	69.6	69.2
17	16	France	67.6	68.5
18	18	Israel	67.3	66.3
19	19	Ireland	64.7	64.8
20	20	Japan	61.7	61.9
21	21	Taiwan - China	60.5	60.2
22	23	Saudi Arabia	59.3	57.0
23	22	Korea	57.4	58.0
24	25	Spain	57.3	56.2
25	24	Portugal	56.8	56.4
26	27	Czech Republic	55.2	55.6
27	30	China	54.7	52.4
28	26	Malaysia	54.5	55.7
29	29	Slovenia	53.6	53.6
30	28	Italy	53.4	54.0
31	31	Poland	52.2	51.3
32	34	Chile	51.3	49.0
33	35	Slovakia	49.6	48.7
34	37	South Africa	48.7	47.7
35	36	Hungary	48.5	48.3
36	33	Russia	48.5	49.3
37	32	Greece	47.0	49.5
38	40	Argentina	45.1	44.2
39	38	Ukraine	45.1	47.4
40	39	Brazil	44.1	45.0
41	42	Serbia	43.4	42.8
42	41	Turkey	43.3	44.0
43	45	Croatia	42.1	41.0
44	44	Bulgaria	41.8	42.0
45	43	Romania	41.7	42.2
46	47	Thailand	41.2	40.0
47	46	Mexico	41.1	40.3
48	48	Iran	39.2	38.9
49	49	India	38.8	36.8
50	50	Indonesia	33.5	33.5

It is seen from the Country summaries included in the U21 Ranking 2019, India is ranked 49 overall which combines ranks of 40 for Resources, 38 for Environment, 49 for Connectivity and 47 for Output. It is ranked 19th for Government expenditure on Higher Education as a share of GDP.

4. The times higher education world university rankings 2019 [5]

The Times survey has taken into account Teaching, Research, Knowledge Transfer and International Outlook of 1,250 Universities all over the World and have been given ranks out of which ranks given to 49 Indian Higher Educational Institutions are shown herein below:-

Table 2

Rank	University/Institution Name
251–300	Indian Institute of Science, Bangalore, Karnataka
351–400	Indian Institute of Technology, Indore, Madhya Pradesh
401–500	Indian Institute of Technology, Bombay, Maharashtra
401–500	Indian Institute of Technology, Roorkee, Uttarakhand
401–500	JSS Academy of Higher Education and Research, Mysore, Karnataka
501–600	Indian Institute of Technology, Delhi
501–600	Indian Institute of Technology, Kanpur, Uttar Pradesh
501–600	Indian Institute of Technology, Kharagpur, West Bengal
501–600	Savitribai Phule Pune University, Pune, Maharashtra
601–800	Amrita Vishwa Vidyapeetham, Coimbatore, Tamil Nadu
601–800	Banaras Hindu University, Varanasi, Uttar Pradesh
601–800	University of Delhi, Delhi
601–800	Indian Institute of Science Education & Research, Pune, Maharashtra
601–800	Indian Institute of Technology, Bhubaneswar, Orissa
601–800	Indian Institute of Technology, Guwahati, Assam
601–800	Indian Institute of Technology Hyderabad, Telangana
601–800	Indian Institute of Technology, Madras, Tamil Nadu
601–800	Jadavpur University, Jadavpur, West Bengal
601–800	National Institute of Technology, Rourkela, Orissa
601–800	Punjab University, Chandigarh, Punjab
601–800	Tezpur University, Tezpur, Assam
801–1000	Acharya Nagarjuna University, Guntur, Andhra Pradesh
801–1000	Aligarh Muslim University, Aligarh, Uttar Pradesh
801–1000	Birla Institute of Technology & Science, Pilani, Rajasthan
801–1000	Indian Institute of Technology (Indian School of Mines), Dhanbad, Jharkhand
801–1000	Indian Institute of Science Education & Research, Kolkata, West Bengal
801–1000	Jamia Millia Islamia, Delhi
801–1000	National Institute of Technology, Tiruchirappalli, Tamil Nadu
801–1000	Osmania University, Hyderabad, Telangana
801–1000	Pondicherry University, Kalapet, Puducherry
801–1000	Sri Venkateswara University, Tirupati, Andhra Pradesh
801–1000	Thapar University, Patiala, Punjab
801–1000	VIT University, Vellore, Tamil Nadu
1001+	Amity University, Noida, Uttar Pradesh
1001+	Andhra University, Visakhapatnam, Andhra Pradesh
1001+	Annamalai University, Chidambaram, Tamil Nadu
1001+	Cochin University of Science & Technology, Kochi, Kerala
1001+	G.B. Pant University of Agriculture & Technology, Pantnagar, Uttarakhand
1001+	GITAM University, Visakhapatnam, Andhra Pradesh
1001+	University of Kerala, Thiruvananthapuram, Kerala
1001+	KIIT University, Bhubaneswar, Orissa
1001+	Maharaja Sayajirao University of Baroda, Vadodara, Gujarat
1001+	Manipal Academy of Higher Education, Manipal, Karnataka
1001+	University of Mysore, Mysore, Karnataka
1001+	PSG College of Technology, Coimbatore, Tamil Nadu
1001+	SASTRA University, Thanjavur, Tamil Nadu
1001+	Sathyabama Institute of Science & Technology, Chennai, Tamil Nadu
1001+	SRM Institute of Science & Technology, Kattankulathur, Tamil Nadu
1001+	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu

Thus it may be seen that Indian Institutions are placed after the ranking of 250 Institutions of other Countries.

5. Reasons for india ranking for below the world ranking of higher education institutions

5.1 In short, a various reasons for low ranking of Higher Educational Institutions in India include the following substantially:-

a. About 35% of faculty positions in State Universities and 40% in Central Universities are lying vacant
b. While enrollment in HEIs have grown up more than 06 times in last 30 years, faculty strength has grown up only 04 times
c. Student faculty ratio is too low. Many colleges are employing teachers on contract basis and such outsourcing of teaching is hampering the quality of education.
d. Graduates lacking basic employability skills including communication, critical thinking skills. Only 7% of the Engineering or MBA Graduates or Employable.
e. Limited International collaborations between Universities
f. Substantial discrepancy in salaries between top tier HEIs and lower rung ones.
g. Low impact of research publications.
h. Inadequate Govt. funding.

5.2 Presently 2017-18 there are about 366.42 Lakhs Enrolments in Higher Education Institutions in India. The Gross Enrolment Ratio is 25.8%. According to the National Human Development Report 2018, India is ranked 131 out of 188 Countries: Only 10% of General Graduates and 25% of Engineers & MBAs are found to be employable. It is widely known that no World Class Research is undertaken in Indian Universities. To transform the system some of the following steps should be taken:-

a. Learner Centered Paradigm of Education should be adopted.
b. Multi-Disciplinary, Industry Oriented, Entrepreneurship and Skill based courses should be introduced.
c. Lifelong learning for Professionals should be encouraged.
d. Teaching learning process should be improved.
e. Incentives to attract quality faculty.
f. Exchange programmes with top end Institutions both in India & Abroad for Faculty Development.
g. Research to be encouraged – Promote Collaborations with International Institutions, Industry and Research Centers to generate a high quality basic and applied research.
h. Encourage Community focused development oriented research.
i. Strengthening of Industry – Academia linkages and provide skill based training.

5.3 The tuition cost is rising more quickly than prices of other goods and family incomes. The employers expect the new graduates to have sufficient efficiency including oral and written communication, team work/collaboration and critical thinking/problem solving. However these qualities are lacking in the fresh graduates. The rate of technology change and growth has been exponential and is not likely to decrease. Online learning will become the key delivery mode in Higher Education in future. Globalization influences Higher Education in multiple ways leading to internationalization of curriculum. There is increased pressure for the accrediting bodies for Universities to demonstrate that College Education is a worthy investment.

6. Methods of teaching

It is well known that effective teaching methods include Lecture, Seminar, Laboratory Training, Practical Training, Field Study, Working on Course Paper/Project, Thesis etc. A Teacher has to use different methods during the Teaching process.

"There is much debate within the higher education community on how teaching or teaching effectiveness may be defined (Braskamp, and Ory; 1994). For instance, Centra (1993), defines effective teaching as "that which produces beneficial and purposeful student learning through the use of appropriate procedures" (p. 42), Braskamp and Ory, (1994, p. 40) include both teaching and learning in their definition, defining effective teaching as the creation of situations in which appropriate learning occurs; shaping those situations is what successful teachers have learned to do effectively (Ref. Article by Dr. Shahida Sajjad, Assistant Professor, Department of Special Education, University of Karachi, Pakistan – entitled "Effective Teaching Methods at Higher Education Level" published in Working paper series: 2008) [6].

However it was not clear whether or not students are legitimate judges of teaching effectiveness. It is considered that students are certainly qualified to estimate the quality of lectures, the value of readings & assignments and the clarity of the teacher's explanations. They are the ones who can report the extent to which the teaching method was useful, productive, informative, satisfying or worthwhile. Some students rate lecture as the best teaching method. Some rate group discussions as the second best method. The other methods of teaching and training include Individual Presentation, Assignments, Seminars, Workshop, Conferences, Brainstorming, Role Play & Case Study.

All the three Countries taken up for study in the paper, namely India, UK & USA have been following the above methods of Teaching & Training in HEIs but the emphasis on some methods may be different according to the perception of the individual teachers.

7. Students Migration

During 2017-18, 46,144 Foreign Students have enrolled in Higher Educational Institutions in India. The Students come from 166 different Countries from across the globe mostly from Nepal (25%), Afghanistan (9.5%), Sudan (4.8%), Bhutan (4.3%), Nigeria (4.0%) followed by Bangladesh, Iran, Yemen, USA & Sri Lanka. Students from developing countries come to India primarily for better job prospects, opportunity to learn English and diversity and attraction of Indian Culture. The highest numbers of foreign students were enrolled in Undergraduate courses, that is, 77.4% of the total foreign students, followed by Post Graduate with about 14.8%

enrolment. Enrolment in rest of the levels constituted 7.8%. Foreign male students were higher in almost all the levels. Some of the reasons for Indian HEIs not attracting foreign students particularly from developed countries relate to poor perceptions about the level of education, life style compromise and limited high quality placements in India.

As per Government data approximately 5.53 Lakhs Indian Students are studying in 86 foreign countries. All 55% of such students are studying in USA & Canada alone.

8. Present situation and initiatives taken to improve the higher education system (comparative situation in UK, USA & India)

Statement showing the Higher Education Enrollment, Expenditure, Ranking of Higher Educational Institutions etc is given below:-

Table 3

Parameter	UK	USA	India
Population	63.1 Million	320 Million	1.33 Billion
Higher Education Enrollment	2.5 Million	21 Million	34.6 Million
Higher Education Gross Enrollment Ratio	61.8%	94.2%	25.8% (Aug. 2018)
HEIs (Nos.)	160 Recognized & 700 Other Colleges	4495	903 Universities & 39050 Colleges including Polytechnics
Higher Education Expenditure (% of GDP)	1.02%	5.42%	0.89%
Globally Ranked Institutions (Times)	29 Rank	51 Rank	Ranked 131 out of 188 Countries as per Human Development Index.
International Students	425265 Nos.	524000 Nos.	48000 Nos. (July 2018)
Employment Rate	73%	59%	-
Unemployment Rate	6.0%	6.3%	-
Research	More than Euro Dollars 25 Million has been allocated including for Higher Education & Research	Universities conduct more than 55% of basic Research	Indian Govt. spent 0.9% on of its GDP on R&D

9. Steps taken by government for improving the standard of higher education in India

a. The Department of Higher Education has been allocated to be Rs. 35,010 Crore in 2018-19, 0.4% increase over the estimate of previous year.
b. Roughly 1% of GDP is spent on Higher Education in India.
c. Enrollment level in Higher Education has been doubled over a period of 11 years from 9% in 2002-03 to 20.8% in 2011-12 to 24.5% in 2015-16 and to 25.8% in 2017-18.
d. It is contemplated to establish Commission of Higher Education for monitoring standards and licensing of accreditation bodies (NBA, NAAC, NBE etc.)
e. Some strategies for enhancing employability of students have been undertaken like:
- Industry Institute Student Training Support
- Industrial Challenge Open Forum
- Long Term Student Industry Placement Scheme
- Industrial Finishing Schools

f. Discouragement of for-profit private educational Institutions while at the same time stimulating private investment in Higher Education to extend Educational opportunities and private intervention for bridging the gap in investment by the Government in Educational Sector.
g. Filling up of Faculty Post's well in time.

10. Suggestions to improve the system of higher education so as to enhance the ranking of higher education institutions in the world ranking

a. To develop Higher Education Institutions (HEIs) with International outlook and global impact.
b. To provide conducive learning environment and provide world class teaching & research.
c. To ease faculty recruitment norms and offer incentives to attract faculty: to retain high quality faculty by implementing tenure based and rewards based systems.
d. To develop skilled, job ready and productive graduates.
e. To provide impetus for developing high quality research, increasing R&D funding by Govt. and increased Industry participation in research and innovations.
f. To award Ph.D. degrees taking into account Article Publications & Intellectual Property Rights (IPR).
g. To ensure that Promotions and Salary for Faculty are based on Publications & Intellectual Property Rights (IPR).
h. To provide conducive educational, financial and regulatory eco system to promote entrepreneurship.
i. To increase faculty development and exchange programmes with top Institutions, International Faculty be invited to teach at Indian Institutions for a short duration.
j. To simplify the regulatory frame work, increasingly move towards autonomy and self-regulation of Institutions.
k. Introduce mandatory accreditation.
l. To link public funding to Institutional performance.

11. Methodology of the study

The study was conducted using the date available in Government and International Ranking Surveys of different Agencies quoted in the papers. Such data are authentic and are quoted by National and International Educational Research investigators. As the study relates to standards of Higher Education, figures relate to recent trends and do not reflect the earlier period. The references, from which the study has made infrastructures, are indicated under the head "References" at the end of the parts.

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